

“PATENT”

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/667,648 Confirmation No. 1123
Applicant : Walter H. Christiansen
Filed : 09/22/2003
Art Unit : 1712
Examiner : Feely, Michael J

Docket No. : US.03.036
Customer No. : 33249

Date : August 5, 2008

Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

DECLARATION PURSUANT TO 37 C.F.R. § 1.132

Sir:

I, Larry Steven Corley, declare and state:

1. I have been employed by Hexion Specialty Chemicals, Inc. or its predecessor company, Shell Chemical Company, where my title is currently “Senior Staff Research Chemist,” since 1978.
2. My educational background includes a Ph.D. in Polymer Science and Engineering from University of Massachusetts, in Amherst, Massachusetts and a B.S. in Chemistry from King College, in Bristol, Tennessee.
3. I am an inventor or co-inventor on at least 58 U.S. patents relating to epoxy and polymer systems.

4. I am listed in the 2000-2001 edition of Who's Who in Science and Engineering published by the Marquis Publishing Company.

5. I was an Associate Editor of the journal *Progress in Polymer Science*, from 1987-1993. I was an Editorial board member of the journal *Progress in Polymer Science*, from 1994-1998.

6. I am an inventor of the invention claimed in the above-identified application.

7. The process of the present application is different from that of Schwarzer and such differences are attributable to the use of an alkali metal hydroxide or alkoxide as a curing accelerator and a curing agent such as dicyandiamide or melamine with protons more acidic than those of water or alcohols.

8. Acidic curing agents such as dicyandiamide and melamine convert $-OH$ and $-OR$ ions of the alkali cure accelerator to water (for an alkali hydroxide accelerator) or alcohol (for an alkali alkoxide accelerator) plus an alkali metal salt of the acidic curing agent. The alkali metal salt of the acidic curing agent then adds itself to the epoxide groups of the epoxy resin to form epoxy-curing agent bonds plus alkali alkoxide groups. The alkali alkoxide groups then react with more of the acidic curing agent to regenerate the alkali metal salt of the acidic curing agent.

9. Epoxy resins with epoxy-curing agent bonds such as epoxy-dicyandiamide or epoxy-melamine bonds have enhanced heat distortion temperatures, higher elongation and increased durability when compared to resins containing only epoxy-epoxy bonds. The result of cure with an alkali accelerator plus dicyandiamide or melamine is not the simple summation of cure by the two materials independently.

10. Schwarzer does not teach or suggest the use of alkali hydroxides or alkoxides with acidic curing agents such as dicyandiamide or melamine to promote bond formation between the curing agents and the epoxy resins. Schwarzer only suggests the use of alkali hydroxides or phenoxides as sole curing agents (which form epoxy-epoxy bonds) (column 6, lines 32-34) and the use of dicyandiamide and melamine as sole curing agents (column 6, lines 51-52).


11. Schwarzer's use of an acidic curing agent and an alkali hydroxide curing agent would not produce the same type of cure as actually seen with applicants' acidic curing agent combined with an alkali hydroxide or alkoxide curing accelerator. Schwarzer's independent use of an alkali hydroxide or alkoxide curing agent produces predominantly epoxy-epoxy bonds, not the epoxy-curing agent bonds of the present invention.

12. Schwarzer only teaches or suggests the use of cure accelerators/promoters when used with anhydride curing agents.

13. Schwarzer only teaches or suggests the use of tertiary amines, octoates, sulfides and phosphines as cure accelerators or promoters. Alkali hydroxides or alkoxides are not mentioned as cure accelerators or promoters, and no cure accelerators or promoters are suggested for use with dicyandiamide or melamine. In contrast, our patent application demonstrates the superiority of alkali compounds over imidazoles (which contain a tertiary amine group) as accelerators for dicyandiamide cure of epoxy resins.

14. I further declare that all statements and representations made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and representations were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

August 5, 2008
Dated



Larry Steven Corley
Senior Staff Research Chemist
Hexion Specialty Chemicals, Inc.